

Claims

What is claimed is:

1. A method of making optical fluoride crystal feedstock, comprising:
loading a fluoride raw material in powder form into a flexible mold; and
applying isostatic pressure to the mold to compress the fluoride raw material.
2. The method of claim 1, further comprising mixing a fluorinating agent in powder form with the fluoride raw material prior to applying isostatic pressure to the mold.
3. The method of claim 1, wherein isostatic pressure is applied to the mold at ambient temperature.
4. The method of claim 1, further comprising evacuating air out of the mold prior to applying isostatic pressure to the mold.
5. The method of claim 1, further comprising melting the compressed fluoride raw material and solidifying the melt to form a solid pre-melt body.
6. The method of claim 5, further comprising crushing the solid pre-melt body and storing the crushed pre-melt in an inert atmosphere.
7. The method of claim 1, wherein the fluoride raw material comprises a metal fluoride selected from the group consisting of CaF_2 , BaF_2 , MgF_2 , SrF_2 , LiF , NaF , M_3AlF_6 , and $(\text{M}_1)_x(\text{M}_2)_{1-x}\text{F}_2$, and mixtures thereof, and where M is selected from the group consisting of Li, Na, K, Rb, and Cs, M_1 and M_2 are selected from the group consisting of Ca, Br, Mg, Sr, Li, Na, and lanthanide series metal fluorides, and x is in a range from 0 to 1.
8. The method of claim 7, wherein the fluoride raw material further comprises a lanthanide series metal fluoride mixed with the metal fluoride.
9. The method of claim 1, further comprising storing the compressed fluoride raw material in an inert atmosphere.

10. A method of making an optical fluoride crystal, comprising:
loading a fluoride raw material in powder form into a flexible mold;
applying isostatic pressure to the mold to compress the fluoride raw material;
loading the compressed fluoride raw material into a crucible; and
growing a crystal by melting the compressed fluoride raw material inside the crucible and
moving the crucible through a thermal gradient.
11. The method of claim 10, further comprising mixing a fluorinating agent in powder form
with the fluoride raw material prior to applying isostatic pressure to the mold.
12. The method of claim 10, wherein isostatic pressure is applied to the mold at ambient
temperature.
13. The method of claim 10, further comprising evacuating air out of the mold prior to
applying isostatic pressure to the mold.
14. The method of claim 10, wherein the fluoride raw material comprises a metal fluoride
selected from the group consisting of CaF₂, BaF₂, MgF₂, SrF₂, LiF, NaF, M₃AlF₆, and
(M₁)_x(M₂)_{1-x}F₂, and lanthanide series metal fluorides, and mixtures thereof, and where M
is selected from the group consisting of Li, Na, K, Rb, and Cs, M₁ and M₂ are selected
from the group consisting of Ca, Br, Mg, Sr, Li, Na, and lanthanide series metal fluorides,
and x is in a range from 0 to 1.
15. The method of claim 14, wherein the fluoride raw material further comprises a lanthanide
series metal fluoride mixed with the metal fluoride.
16. A method of making an optical fluoride crystal, comprising:
loading a fluoride raw material in powder form into a flexible mold;
applying isostatic pressure to the mold to compress the fluoride raw material;
melting the compressed fluoride raw material and solidifying the melt to form a solid pre-
melt body;
crushing the solid pre-melt body; and
growing a crystal by melting the crushed pre-melt and moving the melt through a thermal
gradient.

17. The method of claim 16, further comprising mixing a fluorinating agent in powder form with the fluoride raw material prior to applying isostatic pressure to the mold.
18. The method of claim 16, wherein isostatic pressure is applied to the mold at ambient temperature.
19. The method of claim 16, further comprising evacuating air out of the mold prior to applying isostatic pressure to the mold.
20. The method of claim 16, wherein the fluoride raw material comprises a metal fluoride selected from the group consisting of CaF_2 , BaF_2 , MgF_2 , SrF_2 , LiF , NaF , M_3AlF_6 , and $(\text{M}_1)_x(\text{M}_2)_{1-x}\text{F}_2$, and lanthanide series metal fluorides, and mixtures thereof, and where M is selected from the group consisting of Li, Na, K, Rb, and Cs, M_1 and M_2 are selected from the group consisting of Ca, Br, Mg, Sr, Li, Na, and lanthanide series metal fluorides, and x is in a range from 0 to 1.